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TITLE: **CLAMPING CLIP FOR BUNDLED SINUOUS WIRE**

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## **CLAMPING CLIP FOR BUNDLED SINOUS WIRE**

### **FIELD OF THE INVENTION**

[0001] The present invention relates generally to a device for clamping together in bundled form a plurality of sinuous wire in stacked relationship to one another.

### **BACKGROUND**

[0002] Sofas, chairs and other similarly related furniture are typically comprised of sinuous wires that are used to provide a support structure for the seat bottoms and backs of such furniture. These springs are commonly shipped and stored in bundles that are generally formed by bundling a plurality of sinuous wires together in stacked relationship to one another and manually securing the wires to one another.

[0003] The conventional method for clamping a bundle of a plurality of sinuous wires together is to manually wrap or tie a length of flexible wire around the bundle of wires. Disadvantageously, this method is labor intensive and extremely costly. Further, if the flexible wire is not sufficiently wrapped or tied around the bundle of wires, the wires can readily separate resulting in loose wires. On the other hand, if the flexible wire is wrapped or tied too tightly around the bundle of wires, a user may have difficulty separating the bundle at the desired time of separation.

[0004] Thus, it is desirable to have a device and a method that allows a user to quickly and efficiently clamp a plurality of sinuous wires into a bundle, thereby, reducing the labor costs associated with clamping the sinuous wires together and reducing the likelihood of separation of the sinuous wires during transit. Likewise, it is desirable that a user be able to install and remove the device without the aid of any tools. Further, it is even more desirable that the device and method allow for the potential automation of the clamping process.

[0005] Heretofore, various types of clip devices have been designed for clamping various types of articles together. However, none of these devices and apparatuses relate to a clip device for clamping a plurality of sinuous wires. Therefore, until now, there has not been a device or a method for quickly and efficiently, manually clamping a plurality of sinuous wires into a bundle.

## **SUMMARY OF THE INVENTION**

[0006] It is accordingly an object of the present invention to provide a device and a method for clamping together in bundled form a plurality of sinuous wires. More particularly, it is the object of the present invention to provide a device that can be installed and removed quickly without the aid of any tools, thereby, reducing the associated labor costs. Another object of the present invention is to provide a device and method that can ultimately be mechanized, further improving the efficiency and cost savings associated with the device and method.

[0007] Briefly described, the objects of the present invention are achieved in a clip device and a method for clamping a plurality of sinuous wires into a bundle. The clip device is formed from a single continuous piece of wire having a generally U-shaped configuration with an open end and a closed end for receiving a group of adjacent loops of the bundled sinuous wires into the clip device. The closed end forms the base portion of the clip device and the open end is formed by a pair of legs that extend away from the base portion. Each leg has an end portion that bends inwardly toward the base portion to form a pair of hooks for retaining the bundled sinuous wire.

[0008] The method for clamping the plurality of sinuous wires into a bundle comprises the steps of: (a) gathering a plurality of sinuous wires into a bundle, each sinuous wire having a plurality of loops; (b) compressing the bundle of sinuous wires to eliminate any spacing between the sinuous wires; (c) aligning the loops in the bundle of sinuous wires; and (d) installing the clip device by positioning the hooks of the clip device over one side of a group of adjacent loops in the bundle of sinuous wires, and pulling the base portion of the clip device over the other side of the group of adjacent loops in the bundle of sinuous wires to clamp the bundle together.

[0009] In order to make it easier to install the clip device, the legs of the clip device may be spread and then flattened before positioning the hooks of the clip device over the adjacent loops in the bundle of sinuous wires. Once clip devices have been installed on the bundles of sinuous wires, the clamped bundles of sinuous wires may be stacked on a pallet in a group of eight to ten clamped bundles, heated in an oven to increase the curve in the legs of the clip device and/or packaged for shipping.

[0010] In the preferred embodiment, the clip device is formed from a continuous piece of wire that is formed into a generally U-shaped configuration. The clip device has an open end and closed end for receiving a group of adjacent loops of bundled sinuous wires into the clip device. The closed end of the clip device, which forms the base portion of the clip device, has a width that is selected in relation to the width of a loop in the sinuous wire. The open end is formed by a pair of legs that extend arcuately away from the base portion. The length of the legs are selected in relation to the size and number of sinuous wire bundled for clamping, and can be spread and flattened to promote ease of use in installing the clip device over the sinuous wires. At the end of each leg are end portions that bend inwardly toward the base portion in a differing plane from the base portion to form a pair of hooks for retaining the bundled sinuous wire.

[0011] Accordingly, the preferred embodiment and method, allow a user of the clip device to quickly and easily install the clip device over a plurality of sinuous wires to clamp the sinuous wires together in bundled form. By using the clip device, a manufacturer of the sinuous wires can dramatically reduce the labor costs associated with the conventional method of manually wrapping or tying a length of flexible wire around the bundle of wires for shipping. In addition, because of the simple design of the clip device and the straight forward method for installing the clip device, a manufacturer of the sinuous wires can readily automate the process for installing the clip device and preparing the clamped bundles of sinuous wires for shipping, further reducing the manufacturer's costs.

[0012] Although the preferred embodiment has been described above, it should be understood that the present invention could be adapted to other embodiments other than the preferred embodiment as described herein. For example, the legs of the clip device could be essentially straight rather than arcuately shaped; the base portion, legs, and hooks could extend in a common plane rather than in different planes; or an intermediate portion of the base portion could be indented inwardly in the direction of the legs and toward the hooks to prevent the clip device from disengaging prematurely from the bundled sinuous wire. The disclosed advantages of the present invention, and others, will become apparent upon reading the following detailed description and appended claims, and upon reference to the accompanying drawings.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

[0013] For a more complete understanding of the present invention, reference should now be had to the preferred embodiment of the present invention as described below and illustrated in greater detail in the accompanying drawings, which are not necessarily to scale.

[0014] FIG. 1 is a perspective view of an embodiment of the clip device of the present invention clamped on a bundle of sinuous wires;

[0015] FIG. 2 is a top view of the clip device of Fig. 1;

[0016] FIG. 3 is a side view of the clip device of Fig. 1;

[0017] FIG. 4 is a front view of the clip device of Fig. 1;

[0018] FIG. 5 is a front view of an alternative embodiment of the clip device of Fig. 1 showing the clip device with straight legs and hooks that lie in the same plane with the base portion of the clip device;

[0019] FIG. 6 is a front view of an alternative embodiment of the clip device of Fig. 1 showing the clip device with straight legs and hooks that lie in a different plane from the base portion of the clip device;

[0020] FIG. 7 is a front view of an alternative embodiment of the clip device of Fig. 5 showing an indenture in the intermediate portion of the base portion; and

[0021] FIG. 8 is a front view of an alternative embodiment of the clip device of Fig. 6 showing an indenture in the intermediate portion of the base portion.

### **DETAILED DESCRIPTION OF THE INVENTION**

[0022] The present invention will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as being limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete and will fully convey the scope of the invention to those skilled in the art.

[0023] Turning now to the accompanying drawings and initially Fig. 1, the clip device in accordance with the present invention is illustrated in its totality at 10 and is shown clamping together in bundled form a plurality of sinuous wires 20. The clip device 10 is formed from a single continuous piece of wire having a generally U-shaped configuration.

As illustrated in Fig. 2, the clip device 10 has an open end 30 and a closed end 40. The closed end 40 forms the base portion 40 of the clip device 10, while the open end 30 is formed by a pair of legs 50 extending away from the base portion 40. Each leg 50 has an end portion 60 that bends inwardly toward the base portion 40 to form a pair of hooks 70 for retaining the bundled sinuous wire 20.

[0024] In the preferred embodiment as illustrated in Fig. 3 and Fig. 4, the legs 50 extend away from the base portion 40 arcuately toward the open end 30 of the clip device 10. The legs 50 have end portions 60 that are bent toward the base portion 40 forming hooks 70 that lie in a plane different from that of the base portion 40. The width of the base portion 40 is selected in relation to the width of a loop in the sinuous wire. Similarly, the length of the legs 50 are selected in relation to the size and number of sinuous wire being bundled for clamping.

[0025] In another embodiment of the present invention as illustrated in Fig. 5, the legs 50 of the clip device 10 are straight and lie in the same plane as the base portion 40. Further, as illustrated in Fig. 5 and Fig. 6, in this alternate embodiment, the hooks 70 can be formed to lie either in the same plane as the base portion 40 or in a plane different from the plane of the base portion 40.

[0026] In yet another embodiment of the present invention as illustrated in Fig. 7, an intermediate portion 80 of the base portion 40 can be indented inwardly in the direction of the legs 50 and toward the hooks 70 to prevent the clip device 10 from disengaging prematurely from the bundled sinuous wire 20. In this alternate embodiment, the legs 50 are straight and the end portions 60 of the legs 50 are bent toward the base portion 40 in such a manner that the hooks 70 lie in the same plane as the base portion 40. However, as illustrated in Fig. 8, the hooks 70 can be bent to lie in a plane that differs from the plane of the base portion 40.

[0027] Thus, it is readily apparent that the present invention can be adapted to various embodiments. However, irrespective of the wide physical adaptability of the device of the present invention, the method for clamping together in bundled form a plurality of sinuous wires with the present invention is the same for each embodiment. The method comprises the steps of (a) gathering a plurality of sinuous wires into a bundle, each sinuous wire having a plurality of loops; (b) compressing the bundle of sinuous wires to

eliminate any spacing between the sinuous wires; (c) aligning the loops in the bundle of sinuous wires; and (d) installing the clip device 10.

[0028] The foregoing step (d) of installing the clip device 10 is further comprised of the steps of positioning the hooks 60 of the clip device 10 over one side of a group of adjacent loops in the bundle of sinuous wires 20 and pulling the base portion 40 of the clip device 10 over the other side of the group of adjacent loops in the bundle of sinuous wires 20 to clamp the bundle together.

[0029] In order to more easily position the hooks 60 of the clip device 10 over one side of the group of adjacent loops in the bundle of sinuous wires 20, the legs 50 of the clip device 10 can be spread for receiving the bundle of sinuous wires 20. Once the legs 50 have been spread, the legs 50 can be flattened, thereby making the placement of the clip device 10 over the bundle of sinuous wires 20 easier.

[0030] After the bundles of sinuous wires 20 are clamped together with clip devices 10, the clamped bundles of sinuous wires can be stacked on a pallet in a group of eight to ten clamped bundles, placed in an oven to increase the curve in the legs of the clip device 10 to prevent the clip devices 10 from disengaging, and/or packaged for shipping.

[0031] As is illustrated in the description above, the design of the clip device 10 and the method for clamping together in bundled form a plurality of sinuous wires using the clip device 10 are particularly advantageous because they facilitate the quick and easy clamping of bundles of sinuous wires and prevent the undesired separation of the sinuous wires during shipping and storage. Because of this revolutionary device and method, the labor costs associated with clamping the bundles of sinuous wires are significantly less than the labor costs associated with the conventional method of tying and winding flexible wire around the bundles of sinuous wires together. Moreover, the device and method allow for the automation of the clamping process further reducing the labor costs.

[0032] Many modifications and other embodiments of the present invention will come to mind to one skilled in the art to which this invention pertains, having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the present invention is not to be limited to the specific embodiments disclosed and that all modifications, alternatives, equivalents and other embodiments are intended to be included within the scope of the appended claims.